

creamy-white rather than white, and Stuart Baker (1928, *Fauna of British India, Birds*, 5: 211) noted that the creamy tinge varied greatly between individuals and faded rapidly in skins. It was generally accepted that this colour, often of a patchy nature and usually most prominent on the forehead and on the shoulders, was due to stains from nutmeg (*Myristica* sp.) and other fruits on which the birds fed. Robinson & Chasen (1936, *The Birds of the Malay Peninsula*, 3: 55) agreed with this view but drew attention to the fact that this "staining" was most noticeable in moulting birds.

In the course of the examination of a few specimens which I recently obtained in the Nicobar Islands, I noticed that the feathers around the rump had yellow bases which could only be seen by parting the feathers. With reference to the observation of Robinson & Chasen cited above, I should note that in this area newly developing feathers, while enclosed in quill, were yellowish with the intensity of the colour increasing towards the base. As the tip emerged from the sheath, it was white but showed bright yellow in the portions still enclosed. As the feather developed, the distal portion continued to lose colour, until only the shielded bases remained yellow. If pulled out, the portions ordinarily embedded in the skin showed a brighter colour, which may be termed "butter-yellow", as has been done by Robinson & Chasen (*loc. cit.*)

The creamy colour in the plumage of the pigeon is most constant on the forehead and in roughly symmetrical patches on the shoulders. As far as I could judge from a cursory examination of the larger series in the British Museum, this colour only occurred on such parts as could be reached by the forehead. I found on breaking the sheath that the colour at the base of the feather could be transferred on to paper by rubbing, and I would therefore suggest that this colour is first acquired on the forehead from the growing feathers on the rump and then transferred to the shoulders and other parts of the plumage in the process of preening.

On the South African races of the Crested Francolin, with special reference to *Francolinus sephaena zambesiae* Mackworth-Praed, 1920

by P. A. CLANCEY

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When originally described, *Francolinus sephaena zambesiae* Mackworth-Praed, 1920: Mesanangue, 70 miles above Tete, Zambesi R., Moçambique, was stated to be smaller than the nominate race and to be rather paler, and its range was given as the Zambesi R. valley. Small size when compared with the nominate race of *F. sephaena* (Smith), 1836: Marico and Limpopo Rivers, western Transvaal, is a characteristic of all the south-east African littoral populations of the Crested Francolin as far south as Zululand, where the populations are actually darker and richer coloured and not paler than the xeric *F. s. sephaena*. Roberts (1940 and earlier,

mainly 1935) considered lowland eastern Transvaal birds to represent *F. s. zambesiae*, and using material emanating from this region erected two dubious taxa from northern Bechuanaland (Botswana), *F. s. chobiensis* (Roberts), 1932: Kabulabula, Chobe R., and *F. s. mababiensis* (Roberts), 1932: Mababe Flats), while recently Mackworth-Praed and Grant (1962), Hall (1963) and White (1953, 1965) have merged populations of *F. s. sephaena* and the taxon *F. s. thompsoni* (Roberts), 1924: Grootfontein, northern South-West Africa, with *F. s. zambesiae*, giving it a range from north-western South-West Africa and southern Angola, east to about the Zambesi/Shiré confluence in Moçambique. Traylor (1965) has timeously drawn attention to the unsatisfactory state into which the subspecific grouping of the southern African populations of *F. sephaena* has drifted as a result of such uncritical lumping.

A careful study of the variation in *F. sephaena* in southern Africa recently carried out in the Durban Museum shows that five races require to be admitted, these being *F. s. rovuma* Gray, 1867: Rovuma R., southern Tanzania, *F. s. zuluensis* (Roberts), 1924: Umfolozi Game Reserve, Zululand, *F. s. zambesiae*, *F. s. sephaena*, and *F. s. thompsoni* (with *F. s. chobiensis* and *F. s. mababiensis* as synonyms based on intergrades between *thompsoni* \geq *zambesiae* and *sephaena*). Variation in this francolin affects general size, eastern coastal lowland birds being smaller than the plateau and dry western country ones. Other significant variation is in the nature of the colour of the tail, the extent to which the underside is suffused with buff and the degree to which it is vermiculated. Shifts in these variables are not all similarly stepped or follow the same distributional pattern, and none of the variation is truly clinal. The variation rather follows lines imposed by isohyetal, isothermal and altitudinal contours. As much of the present disagreement on the southern subspecies of *F. sephaena* seems to stem from the fact that few workers are aware of the true characters of *F. s. zambesiae* and its correct range. I have prepared the following description based on comparison with *F. s. sephaena* in order to set matters aright and to justify the races adopted in Clancey (1965), the ranges in which are here somewhat modified.

F. s. zambesiae is similar to the nominate race, but is rather lighter and more scaled on the crown and nape; lower hind neck and mantle brighter and redder (about Amber Brown [*vide* Ridgway 1912]), this bright red colour extended caudadwise over the lower mantle, scapulars, wing-coverts and tertials, which are distinctly less greyish or earthen brown than in *F. s. sephaena*; rump and upper tail-coverts washed with deep ochraceous-buff, less greyish-olive. Below, with the throat and breast spotting less dark Clove Brown and somewhat sparser, and the whole ground from the lower fore-throat to the under tail-coverts bright buff, the last named quite rusty in most; vermiculations to the breast and lateral body surfaces less dense, and long feathers to the sides of the body and flanks boldly streaked, often on both vanes, with deep tawny (no tawny lateral body streaks in other South African races). In wings, outer web to each primary cinnamon, not greyish-brown, and tail wholly redder, the inner pairs of rectrices about Argus Brown. Smaller in size on average: wings of ♂♂ 151—166.5, ♀♀ 150—161, as against 157—172 and 154—164 mm.

The range of *F. s. zambesiae* is from the northern districts of southern Moçambique to the west of the range of *F. s. rovuma* in the districts of Tete and Manica e Sofala, and adjacent northern Rhodesia, west to the Sebungwe sector and Wankie, penetrating into northern Botswana at Kasangula. Also in southern Zambia (west to about Livingstone) and southern Malawi (Lengwe; Chiromo). It may reach further west into south-eastern Angola, judging by Traylor's (1960) comments on birds from Capelongo. Intergrades with *F. s. sephaena* and *F. s. thompsoni* on the western periphery of its range.

As to the other South African races of this francolin: *F. s. rovuma* is probably specifically discrete from *F. s. sephaena*, though clearly a semi-species in the same superspecies, but it requires further study in the field at its point of contact with *F. s. zuluensis* in coastal Moçambique, and need not be discussed here. *F. s. zuluensis* is consistently smaller than *F. s. sephaena*, rather more saturated above and deep olivaceous-buff coloured below. It occupies the eastern coastal lowlands of Africa from Zululand and eastern Swaziland to about the Save R., in Moçambique. *F. s. sephaena* is larger than *F. s. zuluensis*, a little paler above, and more creamy, not deep olivaceous-buff, below, but the vermiculations are about the same. It ranges from north-eastern, northern and western Transvaal and the Rhodesian plateau in the south and west, to eastern and northern Botswana, apparently as far west as southern Ngamiland. *F. s. thompsoni* is like *F. s. sephaena* but is more sparsely vermiculated below on a paler ground, the vermiculations largely absent from the medio-ventral plane (see Traylor 1960), and is restricted to northern Damaraland and Ovamboland to north-eastern South-West Africa, (?) the western Caprivi, and south-western Angola.

F. s. zambesiae differs from all the foregoing in having the ground colour to the hind neck, mantle, scapulars, wing-coverts and tertials wholly redder, this tendency to redness also evident in the remiges and rectrices, while the trend is further evident by the presence of tawny streaks to the lateral body surfaces and flanks (which criterion is not present in other subspecies). The range, as given above, lies to the north-east of the ranges of the other races (apart from *F. s. rovuma*). It intergrades with *F. s. sephaena* and *F. s. thompsoni* in parts of northern Botswana and the eastern Caprivi.

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On subspeciation in *Bias musicus* (Vieillot)

by P. A. CLANCEY

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Subspecific variation in the African broadbilled flycatcher *Bias musicus* (Vieillot) has been discussed wholly or in part by numerous workers, the more important reports being those of van Someren (1922), Sclater (1930), Chapin (1953), Rand, Friedmann and Traylor (1959) and White (1963), four races being generally admitted, these being as follows: *B. m. musicus* (Vieillot), 1818: Malimbe, Portuguese Congo, *B. m. feminina* Jackson, 1906: Toro, Uganda, *B. m. changamwensis* van Someren, 1919: near Mombasa, coastal Kenya, and *B. m. pallidiventris* van Someren, 1922: Canhoca, Cuanza Norte, Angola. Variation in this flycatcher affects general size and the colour of the female and the male in pre-basic dress. Generally speaking, western birds are largest, and in females and young males have the mantle and scapulars boldly streaked with sepia, and the underside is pale buff, the breast and lateral surfaces washed with rusty, and the flanks are somewhat streaked or spotted with sepia. In eastern African birds the dorsal streaking is restricted to the upper mantle and the lower hind neck, and does not extend on to the remainder of the mantle and scapulars, which surfaces incline to be paler, and below, the ground is a lighter buff and the lower throat and breast are less or not overlaid with tawny. At the present time four racial names are utilized to describe this variation, two of them applicable to taxa which are intermediate in their putative characters between the marked western and eastern extremes. A recent examination of a reasonable panel of material in the Durban Museum has revealed that some of the variation described by workers is simply the result of wear and the metamorphic changes wrought in a relatively short space of time by the strong African sun, and is not genetically related. It now seems that the marked changes effected by these agencies have not been fully appreciated hitherto in arranging the populations of *B. musicus* into acceptable geographical races.

In freshly moulted females and young males of all populations of *B. musicus* the ground colour to the mantle, scapulars, rump and upper tail-coverts is about the Amber Brown of Ridgway (1912, pl. iii), but in most populations there is a marked change in the space of only a few months, when the same surfaces may appear Tawny or Ochraceous-Tawny (pl. xv). At the same time, the ground to the whole of the ventral surface whitens, and the issue is further complicated in that not all populations wear at the same rate or so drastically. However, in assessing the subspecific variation, conclusions must, of necessity, be restricted to birds in fresh dress.

To turn to the two names given to the "intermediate" populations, namely *B. m. feminina* and *B. m. pallidiventris*, I find that specimens from